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Canada

SURFACE TARGETS PRESENTATION

PRESENTED AT THE NDIA TARGET AND RANGES CONFERENCE
NOVEMBER 2, 2005

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TOPICS

Surface Vehicles

- **Barracuda - Uninhabited Surface Vehicle (USV)**
  - Target role
  - “Kill” Tow Targets
  - Air-to-ground engagements
  - Surveillance Role
  - Decoy Role
  - New Development Programs

- **Unmanned Ground Vehicle Platform (UGV)**
  - Badger – Target Role
    - Tactical Role
  - Badger 2 – Air-to-ground target
  - Multi-agent Tactical Sentry

Today's Surface Threats

Traditional Threats

Swarm Threat (Fast Inshore Attack Craft)

Chinese/Iranian Fast Attack Craft

Boston Whaler (Fast Inshore Attach Craft)

BARRACUDA

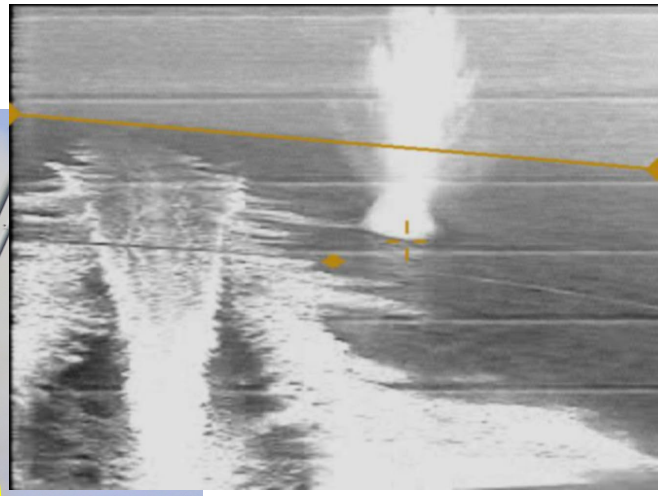
- Prototype used by USN for Testing during first Gulf War
- In service with Canadian Navy since 1992 – Initial six (6) vehicles still in full operational condition
- Completed OTH demonstration for NG1 – range of 3600 NM achieved
- In service with
  - Canadian Navy
  - Saudi Navy
  - Japanese Navy
  - Swedish Navy
- Turnkey Operations
  - Norway
  - Singapore
  - Malaysia
  - Thailand

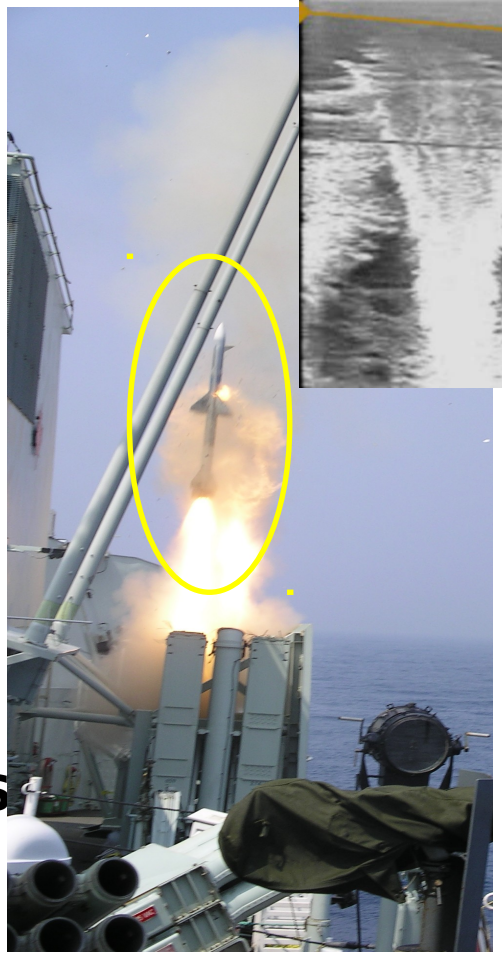
DESIGN CONSIDERATIONS

- **SPEED**
  - +36 KNOTS IN SEA STATE 3 **-** Used existing Volvo Penta engine (41 ADP) and added Turbo Booster and counter rotating propellers
- **DEPLOYABILITY**
  - Used the existing RIB workboats from Canadian Navy Inventory. These can be Davit mounted on ship for ease of deployment to firing site or for forward deployment
  - Also ideal for future tactical applications
- **SURVIVABILITY**
  - Had to survive shrapnel hits and direct hit from BLP shells
- **RADAR RELECTIVITY**
  - Radars must be able to acquire and hold lock
- **THREAT REPRESENTATIVE**
  - Performance characteristics and threat signature of high speed attack boats

SEA SPARROW ENGAGEMENT

- **CDN NAVY OPERATIONS OFF VACAPES**
- **MANDATORY REQUIREMENT FOR REAL TIME SCORING**
- **INITIAL PLAN WAS TO FIRE TWO (2) MISSILE – FOUR (4) MISSILES WERE FIRED**
- **ALL MISSILES WERE SCORED USING A MIX OF DOPPLER MDI'S AND SPIES**





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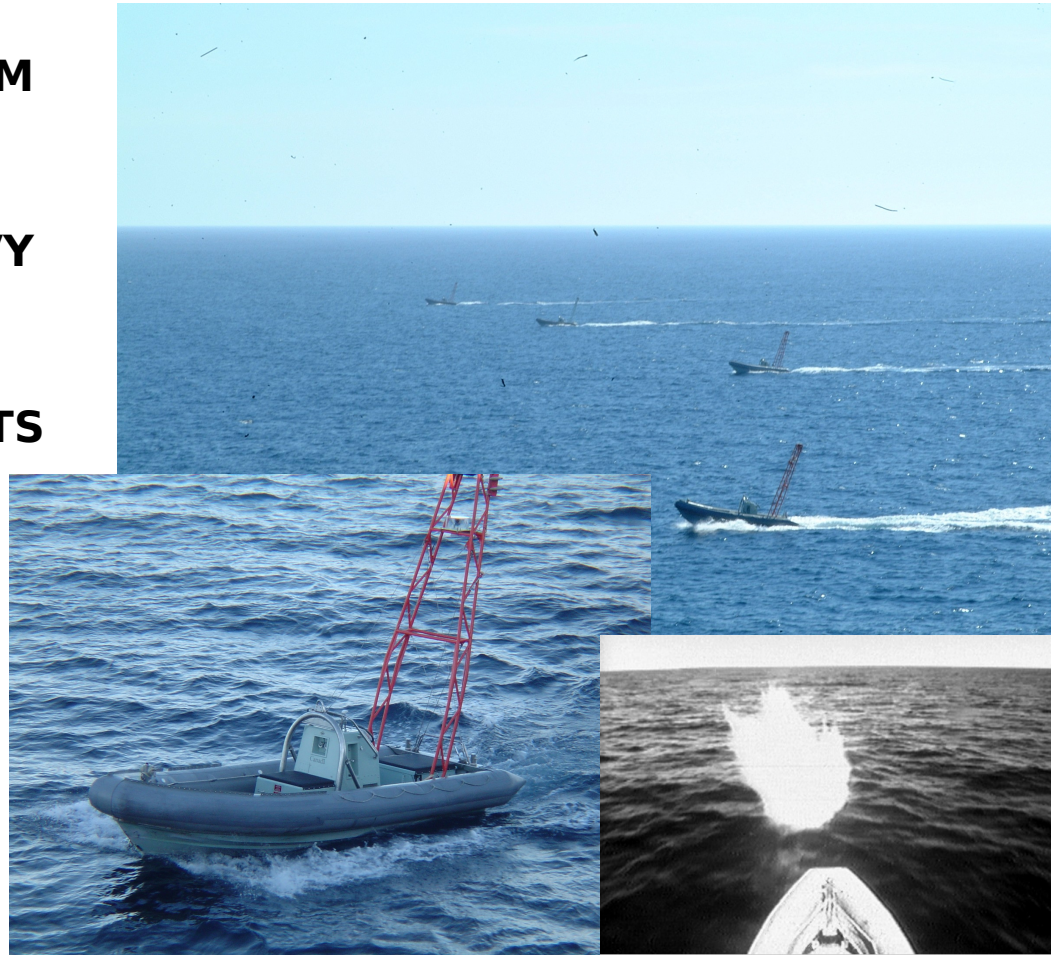
SWARM PRELIMINARY EXERCISE

- **INITIAL TESTING FOR SWARM CONCEPT**
- **UTILIZED EXISTING CDN NAVY HARDWARE**
- **OPERATED FOUR (4) TARGETS SIMULTANEOUSLY FOR TWO DAYS (11 HRS + 17 HRS)**
- **PROVIDED VISUAL (SPIES) AND ACCOUSTIC SCORING**
- **ABLE TO DISSEMINATE ROUNDS ON EACH TARGET**



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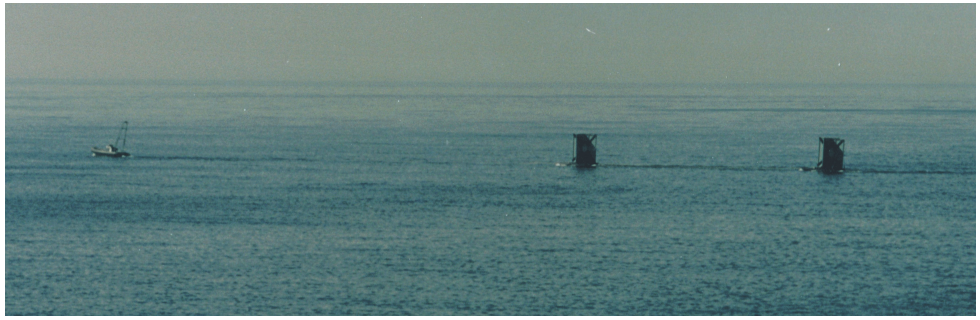
“KILL” TOW TARGETS



- initial development was for a suitable tow target for hellfire missile engagement for Norwegian navy
- Six targets manufactured, 22 Hellfire missiles fired, all 6 target bodies survived
- Towing Speed 15 knots

- Speed 20 – 30 Knots
- Acceptable Radar Return through engagability envelope
- Survivable – up to 5 hits
- Easily deployable (recoverable) from deck of ship of helo platform

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AIR-TO-

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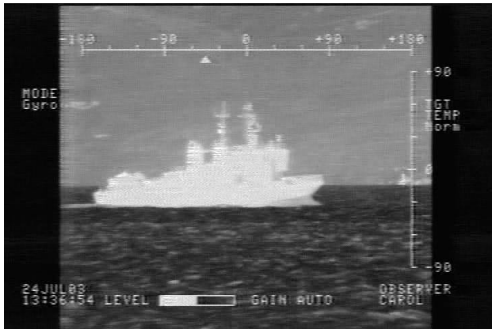
SURVEILLANCE



- **Installed 12” Ball obtained on loan from WESCAM**
- **Total Integration Time less than eight weeks**
- **Part of Pacific Littoral Experiment 2 of a Uninhabited Surface Vehicle (USV)**
- **Conducted five day trail at Nanoose Range**
- **Interfaced with the Global Command and Control System (GCCS-13)**

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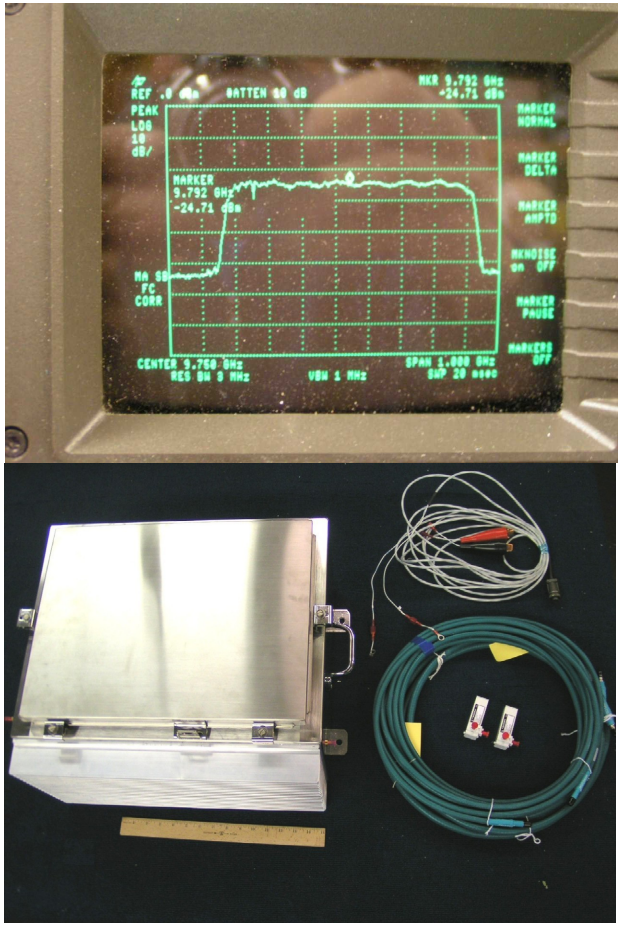
DECOY ROLE

- **INTEGRATED THE BOEING RADAR FREQUENCY/SIGNATURE AUGMENTATION SYSTEM (RF/SAS)**
- **INTENT WAS TO DEMONSTRATE A SUITABLE RCS SIGNATURE THAT COULD BE TAILORED**
- **SIMILAR TECHNOLOGY TO WHAT WE DID WITH THE HELO ON VINDICATOR AND DREEM PROGRAM**
- **RESULTS EXCEEDED EXPECTATIONS AND WE ARE NOW IN A POSTION WHERE WE CAN “TAILOR”**



NEW DEVELOPMENT PROGRAMS

DATA COLLECTION

- INTEGRATE VISUAL (SPIES), ACOUSTIC AND DOPPLER SCORING
- ABLITY TO DIFFERNTIATE SCORES BETWEEN TARGET PLATFORM
- PRELIMINARY TESTING COMPLETED ON PREVIOUS EXERCISES

–

MULTI TARGET COMMAND AND CONTROL

- CONTOL UP TO SIXTEEN (16) TARGET SIMULTANEOUSLY
- TO SIMULATE FIAC THREAT
- NEW LOW COST TARGET PLATFORM IDENTIFIED
- ACCEPTANCE TESTING TO BE COMPLETED BY MARCH 31, 2006

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UNMANNED GROUND VEHICLES

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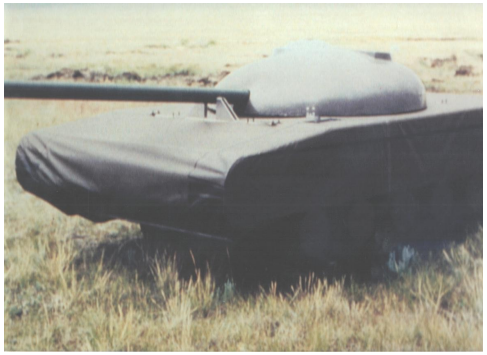
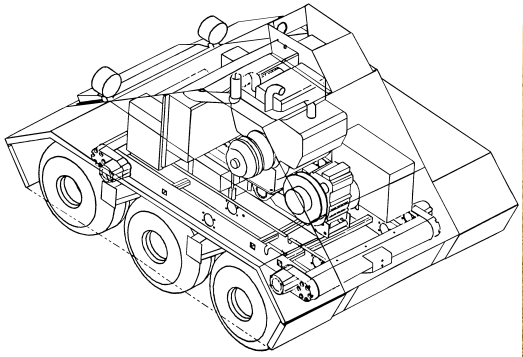
Badger Target Configuration

Fully Armoured
Protection for shrapnel and small arms fire
IR Lights for nighttime operations





Length: 241 cm (95 IN.)

Width: 146 cm (57.5 in.)

Height: 87 cm (34.5 in)

Weight: (lightly armoured) 726 kg (1600 lbs)

Payload Weight: 91 kg (200 lbs)

Engine: Onan, 24 hp, 2 cyl, air cooled

Fuel Capacity: 30 liters (6.6 Imp. Gal)

Command Transmitter Power: 25 watts

Video TM transmitter power: 10 watts

Electrical Payload Capacity: 12 Volts, 50 Amps

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ERYX MISSILE FIRING

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TOW MISSILE

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BADGER 2

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- **Designed for operations in harsh environment – Cold Lake Range , Muskeg, Swamp, Deep Snow etc.**
- **Target designed to replicate ADATS Air Defence System**
- **Deployed during Operation Maple Flag 05 for air-to-ground**
- **First time ‘moving’ ground targets used**
- **Operated for total 7 week exercise – 40 days**
- **Comments from all participants were very positive**
- **“ marked improvement on air-to-ground training”**

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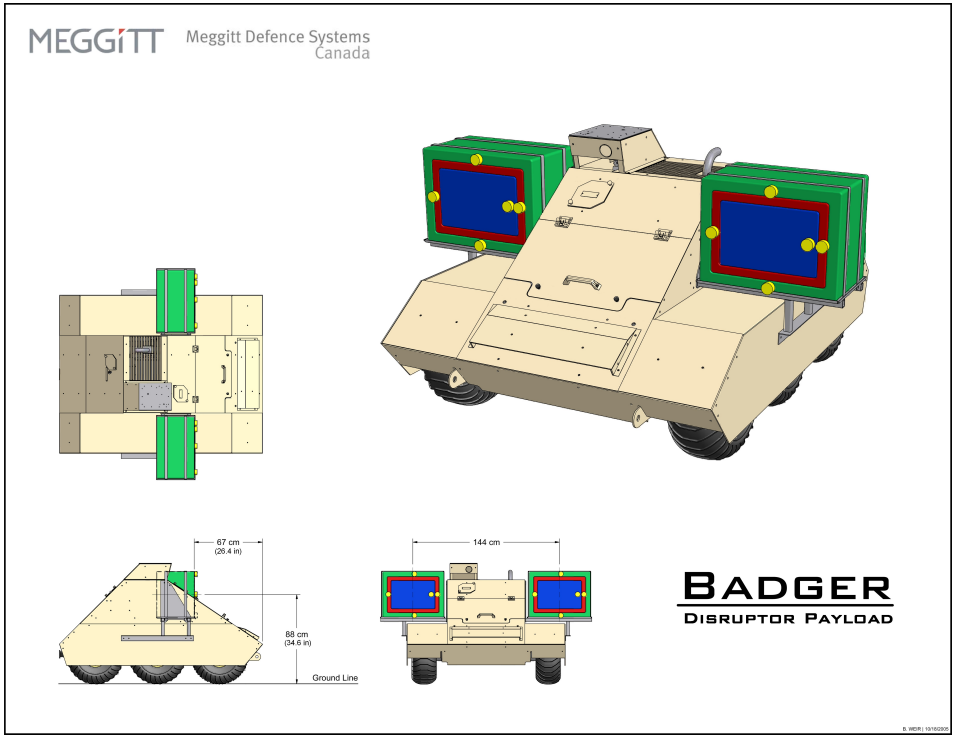
DISRUPTOR PAYLOAD



- New system developed by DRDC for Car Bomb Threats
- Badger UGV will lead convoy
- Badger can provide video feedback and remote activation
- If a suspect vehicle is encountered the UGV can conduct a survey and, if deemed a potential danger, the “Disruptor System” will be activated to negate the threat

RANGER SUV PLATFORM

- Designed to replicate typical SUV threat platform

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Multi-Agent Tactical Sentry

- **Development of NBCD Vehicle for 1st responders**
- **Two (2) Vehicles delivered to Cdn Army in 2004 for evaluation and Concept of Operation tactics.**
- **Three (3) Vehicles delivered in Oct 05**
- **All vehicles to be deployed with Cdn Army to Kandahar**
- **C&C uses “ANCEOUS” technology developed at DRDC Suffield – More Autonomous operation**

SUMMARY

- **THREATS FACING CANADIAN FORCES AND ALLIES ARE THE SAME**
- **CANADIAN INDUSTY, IN CONCERT WITH DEFENCE RESEARCH ESTABLISHMENTS (DRDC), ARE WORKING TO PROVIDE REALISTIC TRAINING AND TACTICAL PLATFORMS**
- **HISTORICALLY CANADA AND THE U.S. HAVE CONDUCTED NUMEROUS CO-OPERATIVE PROGRAMS TO DEVELOP PRODUCTS THAT ARE COMPLIMENTARY TO BOTH SERVICES**
- **THE DEFENCE DEVELOPMENT SHARING AGREEMENT (DDSA) WAS DEVELOPED TO PROVIDE 50% FUNDING FOR COOPERATIVE R&D PROGRAMS**
- **WE ARE STILL VERY INTERESTED IN WORKING WITH U.S. INDUSTRY AND D.O.D. ON COOPERATIVE PROGRAMS**